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already and previously been clearly made by PENHALLOW. The author also attempts to separate the woods of the Podocarpeæ from those of the Cupressineæ in the larger sense, on the basis of the structure of the pits in the ray-cells. The success of this distinction may be judged from the fact that it results in putting *Sciadopitys* with the Podocarpeæ. *Pityoxylon* of Kraus is broken up by this writer into two genera, *Piceoxylon* and *Pinusoxylon*. The latter genus represents the wood of *Pinus*, and seems somewhat unfortunate, since it is doubtful if the mesozoic pines had the wood structure which is found as characteristic of that genus in Tertiary and modern times. There are also disquisitions on spiral striation in the wood of the gymnosperms and on the value of annual woody rings as diagnostic of geologic formations. The work closes with two tables for the determination respectively of living and fossil gymnospermous woods. There is likewise an index and an alphabetical list of the living woods investigated by the author.—E. C. JEFFREY.

Injury by smoke.—Frequent controversies and law suits, arising from damage to agricultural crops by the smoke produced by manufacturing establishments in Germany, have made the recognition of this form of injury extremely important. In order to furnish a basis for distinguishing smoke-injury from injuries due to other factors, SORAUER¹³ has made a comparative anatomical study of various kinds of injury commonly occurring in the more important grains, oats, wheat, and barley. The paper contains detailed comparative descriptions of changes in the cell walls and cell contents which cannot be severally noted here. The general plan followed in each case is represented by the following heads: The behavior of the normal plant in its gradual, natural dissolution; abnormalities in smoke-free regions; the phenomena in plants injured by chlorine and by hydrochloric acid fumes; experimental tests of the influence of hydrochloric acid fumes; phenomena confused with smoke injuries. In natural death the cells lose a large part of their contents and finally (except the epidermal cells) collapse completely. This process first involves the tip and edges of the leaves. In cases of death resulting from other causes, as drought, the cells do not collapse so completely, since the contents are not fully resorbed. In injuries due to acid fumes from smoke, the contents of the mesophyll cells contract into an irregular greenish lump, while the cell walls partially collapse.

The most striking feature about this form of injury is the collapse of the epidermal cells. The accompanying changes of the cell contents and cell walls in these and in many other forms of injury are minutely described. The recognition of smoke injury in general is based on the fact that the cells, dying rapidly, collapse partially without being emptied of their contents, the epidermal cells showing the same phenomena. The author continually emphasizes the fact, however, that no clearly defined symptoms for the absolute and certain recognition of smoke injury can be given, but that in all cases a comparative study of

¹³ SORAUER, P., Beitrag zur anatomischen Analyse rauchbeschädigter Pflanzen. Landw. Jahrb. 33:585-664. pl. 15-18. 1904.

plants growing under the immediate influence of the acid fumes and others growing under similar conditions but not within the smoke zone, must be made.—H. HASSELBRING.

Viticulture.—Recent publications from the Royal Hungarian Central Institute of Viticulture are as follows: Volume III, part 2, consists of chemical analyses of the stems and shoots of American species used for stocks in Hungary.¹⁴ The points determined were the moisture content, ether extractives (oils, fats, waxes, gums, and organic acids not further determined), alcoholic extractives (tannin, glucotannin, vanillin, and organic acids), nitrogen, starch, cellulose, and proteids. The paper contains a large number of analyses made at different seasons, but no general results have yet been reached, and it is difficult to see what may be expected. Part 3 of this volume is a small paper by ISTVÁNFFI¹⁵ in which he describes a disease of the vine caused by *Phyllosticta Bizzozzeriana* Massal. The disease is not of great importance, but has been mistaken for the black rot, one of the most dangerous vine diseases. In the part 4 ISTVÁNFFI¹⁶ gives the results of his investigations on the gray rot, caused by *Botrytis cinerea*. The first part of this paper is taken up with the effects of various kinds of poisons and other treatments as cold, drying, etc., on the spores of the fungus. One of the most striking results is the unusually high resistance which the spores are said to have to copper. Spores were kept twenty-four hours in different strengths of Bordeaux mixture ranging from 1 to 10 per cent., to which was then added must containing 1 per cent. of tartaric acid, so that the resulting solutions contained the equivalent of 0.3 per cent. CuSO_4 . Of the spores from the lowest strength mixture 38–40 per cent. germinated, of those in the highest 10–12 per cent. germinated. Spores sown on berries in 3 per cent. Bordeaux mixture germinated and penetrated the epidermis. Spores, kept one hour in a 2 per cent. solution of CuSO_4 , which was then diluted with ten times its volume of must, germinated. Many other similar experiments are given. The second part of the paper deals with the development and life history of *Botrytis cinerea* and methods of control. Very little new is added to the life history of the fungus. For treatment, spraying with a 5 per cent. solution of calcium bisulfid is recommended.—H. HASSELBRING.

Endotrophic mycorrhiza.—The long and important paper of GALLAUD¹⁷ on this subject merits brief summary, as his conclusions are quite revolutionary. He has described for the first time the anatomical and cytological characters of

¹⁴ GASPAR, J., Analyses des sarments américains. Ann. Inst. Cent. Ampél. Roy. Hongrois 3:57–166. pls. 4–12. 1905.

¹⁵ ISTVÁNFFI, Gy. de, D'une maladie de la vigne causée par le *Phyllosticta Bizzozzeriana*. Idem, 167–182. pl. 13. 1905.

¹⁶ ISTVÁNFFI, Gy. de, Études microbiologiques et mycologiques sur le rot gris de la vigne. Idem, 183–360. pls. 14–21. 1905.

¹⁷ GALLAUD, I., Études sur les mycorrhizes endotrophes. Rev. Gén. Bot. 17: pls. 4. 1905.